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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/881,554 | 06/14/2001 | Charles Tyler Eyteheson | DP-304198 | 6825 |

7590 09/30/2003

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| EXAMINER | |
|---|---|
| ERDEM, FAZLI | |
| **ART UNIT** | **PAPER NUMBER** |
| 2826 | |

DATE MAILED: 09/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/881,554 | EYTCHESON, CHARLES TYLER | |
| | Examiner | Art Unit | |
| | Fazli Erdem | 2826 | |

*-- Th MAILING DATE of this communication appears on th cov r sh t with th correspond nc address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *24 June 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-5,7-17,19-25,27-37,39 and 40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7,8,10-17,19-25,27-37,39 and 40* is/are rejected.

7)☒ Claim(s) *9* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

### *Allowable Subject Matter*

1. Claims 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 5, 7, 8, 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Powers et al. (4,529,836) in view of Kwitkowski et al. (5,136,122) in view of Bowman et al. (6,083,772) further in view of Tamarkin (5,903,439) further in view of Williams et al. (6,307,755).

Regarding Claims 1-3, 5, 7, 8 and 10-13, Powers et al. disclose a stress absorption matrix where where an apparatus for interfacing materials and absorbing disparate thermal expansions that utilizes a woven wire mesh to support a predetermined thickness of a first soft solder which absorbs expansions, and utilizes a second soft solder having a lower melting point than the first to coat the surfaces of the wire mesh/first soft solder combination so that the materials can be bonded together. Powers et al. fail to disclose the connection and electrical circuitry bonding

structures in the required manner. However, Kwitkowski et al. disclose a braided fiber omega connector where an improved omega connector for electrically coupling components of a multi-component electronic assembly comprises a first and second flat end sections each formed on a nonporous copper plated adapted for solder bonding to components, and an intermediate loop section formed of interwoven copper fibers extending between the end sections to provide a continuous electrically conductive network therebetween. The fibers in the loop section carry a solder nonwettable coating to avoid interference with bonding operations to attach the end section to the components. The fibrous loop section exhibits enhanced flexibility to reduce stresses attributed to shifting of the components during operations and thereby extends the useful life of the assembly. Furthermore, Bowman et al. disclose a method of mounting a power semiconductor die on a substrate, where the die has a first power terminal on a first surface thereof and a second power terminal on an opposing second surface thereof. The method includes the steps of forming an electrically-conductive, mechanical bond between the first surface and a first location on the substrate, the mechanical bond electrically coupling the first power terminal to the substrate and soldering an elongated electrically conductive strap to the second surface and a second location on the substrate. Powers et al., Kwitkowski et al., and Bowman et al. fail to disclose the solder infiltrated mesh connection structure. However, Tamarkin discloses a mezzanine connector assembly where a epoxy infiltrated mesh connection structure is disclosed. Williams et al. disclose a connection structure where an epoxy or solder structure are used interchangeably.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the required solder infiltrated mesh connection structure in in

Powers et al., Kwitkowski et al., and Bowman et al. combination as taught by Tamarkin and Williams et al. combination, because such structure would provide a thermally and physically better connection structure for the circuit assembly components.

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Powers et al. (4,529,836) in view of Kwitkowski et al. (5,136,122) further in view of Bowman et al. (6,083,772) further in view of Ameen et al. (5,591,034) further in view of Tamarkin (5,903,439) further in view of Williams et al. (6,307,755).

Together in combination Powers et al., Kwitkowski et al., Bowman et al., fail to disclose the heatsink structure. However, Ameen et al. disclose a thermally conductive adhesive interface that is suitable for thermal conduction between electronic components. Furthermore Ameen et al. disclose the heat sink structure.

Powers et al., Kwitkowski et al., Bowman et al., and Ameen et al. fail to disclose the solder infiltrated mesh connection structure. However, Tamarkin discloses a mezzanine connector assembly where a epoxy infiltrated mesh connection structure is disclosed. Williams et al. disclose a connection structure where an epoxy or solder structure are used interchangeably.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the required solder infiltrated mesh connection structure in in Powers et al., Kwitkowski et al., Bowman et al., and Ameen et al. combination as taught by Tamarkin and Williams et al. combination, because such structure would provide a thermally and physically better connection structure for the circuit assembly components.

4. Claims 14, 15, 17, 19, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Powers et al. (4,529,836) in view of Kwitkowski et al. (5,136,122) further in view of Bowman et al. (6,083,772) further in view of Kumar et al. (6,280,584) further in view of Tamarkin (5,903,439) further in view of Williams et al. (6,307,755).

Regarding Claims 14, 15, 17, 19, 20, together in combination Powers et al., Kwitkowski et al., Bowman et al., fail to specifically disclose thermal conductivity characteristics of the claimed subject matter. However, Kumar et al. (6,280,584) disclose a compliant bond structure for joining ceramic to metal, which includes a wire mesh strands surrounded by compliant metal that is useful for bonding ceramic surface to a metal surface. The wire mesh comprises interlocking strands having longitudinal axes that are oriented substantially parallel to the ceramic and metal surfaces. The wire mesh may also include strands having a coefficient of thermal expansion that is about 0.4 to 1.6 times the average of the coefficients of thermal expansion of the metal and ceramic surfaces.

Powers et al., Kwitkowski et al., Bowman et al., and Kumar et al. fail to disclose the solder infiltrated mesh connection structure. However, Tamarkin discloses a mezzanine connector assembly where a epoxy infiltrated mesh connection structure is disclosed. Williams et al. disclose a connection structure where an epoxy or solder structure are used interchangeably.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the required solder infiltrated mesh connection structure in in Powers et al., Kwitkowski et al., Bowman et al., and Kumar et al. combination as taught by

Tamarkin and Williams et al. combination, because such structure would provide a thermally and physically better connection structure for the circuit assembly components.

5. Claims 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Powers et al. (4,529,836) in view of Kwitkowski et al. (5,136,122) further in view of Bowman et al. (6,083,772) further in view further in view of Kumar et al. (6,280,584) further in view of Ameen et al. ((5,591,034) further in view of Tamarkin (5,903,439) further in view of Williams et al. (6,307,755).

Together in combination Powers et al., Kwitkowski et al., Bowman et al., and Kumar et al. (6,280,584) fail to disclose the heatsink structure. However, Ameen et al. disclose a thermally conductive adhesive interface that is suitable for thermal conduction between electronic components. Furthermore Ameen et al. disclose the heat sink structure.

Powers et al., Kwitkowski et al., Bowman et al., Kumar et al., and Ameen et al. fail to disclose the solder infiltrated mesh connection structure. However, Tamarkin discloses a mezzanine connector assembly where a epoxy infiltrated mesh connection structure is disclosed. Williams et al. disclose a connection structure where an epoxy or solder structure are used interchangeably.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the required solder infiltrated mesh connection structure in in Powers et al., Kwitkowski et al., Bowman et al., Kumar et al., and Ameen et al. combination as

taught by Tamarkin and Williams et al. combination, because such structure would provide a thermally and physically better connection structure for the circuit assembly components.

6. Claims 21-23, 25 and 27-32 are rejected under 35 U.S.C. 103(a) as being unpatentable Powers et al. (4,529,836) in view of Bowman et al. (6,083,772) further in view of Sanborn et al. (5,221,399) further in view of Williams et al. (6,307,755).

Regarding Claims 21-23 and 27-32, Powers et al. disclose a stress absorption matrix where where an apparatus for interfacing materials and absorbing disparate thermal expansions that utilizes a woven wire mesh to support a predetermined thickness of a first soft solder which absorbs expansions, and utilizes a second soft solder having a lower melting point than the first to coat the surfaces of the wire mesh/first soft solder combination so that the materials can be bonded together. Powers et al. fail to disclose the method of doing required electrical circuitryt structure. However, Bowman et al. disclose a method of mounting a power semiconductor die on a substrate, where the die has a first power terminal on a first surface thereof and a second power terminal on an opposing second surface thereof. The method includes the steps of forming an electrically-conductive, mechanical bond between the first surface and a first location on the substrate, the mechanical bond electrically coupling the first power terminal to the substrate and soldering an elongated electrically conductive strap to the second surface and a second location on the substrate.

Powers et al., and Bowman et al. fail to disclose the method of using solder infiltrated mesh connection structure. However, Sanborn et al. disclose a joining of printed wiring board to

aluminum stiffener using adhesive film, electrically insulative mesh structure that cures at room temperature the method of using epoxy infiltrated mesh connection structure is disclosed. Williams et al. disclose a connection structure where an epoxy or solder structure are used interchangeably.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the method of using required solder infiltrated mesh connection structure in in Powers et al., and Bowman et al. combination as taught by Sanborn et al. and Williams et al. combination, because such structure would provide a thermally and physically better connection structure for the circuit assembly components.

7. Claims 33, 34, 35, 37, 39, 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Powers et al. (4,529,836) in view of Bowman et al. (6,083,772) further in view of Kumar et al. (6,280,584) further in view of Sanborn et al. (5,221,399) further in view of Williams et al. (6,307,755).

Regarding Claims 34, 35, 37, 39, 40 Powers et al. and Bowman et al. combination fail to specifically disclose thermal conductivity characteristics of the claimed subject matter. However, Kumar et al. (6,280,584) disclose a compliant bond structure for joining ceramic to metal, which includes a wire mesh strands surrounded by compliant metal that is useful for bonding ceramic surface to a metal surface. The wire mesh comprises interlocking strands having longitudinal axes that are oriented substantially parallel to the ceramic and metal surfaces. The wire mesh may also include strands having a coefficient of thermal expansion that is about

0.4 to 1.6 times the average of the coefficients of thermal expansion of the metal and ceramic surfaces.

Powers et al., Bowman et al., and Kumar et al. fail to disclose the method of using solder infiltrated mesh connection structure. However, Sanborn et al. disclose a joining of printed wiring board to aluminum stiffener using adhesive film, electrically insulative mesh structure that cures at room temperature the method of using epoxy infiltrated mesh connection structure is disclosed. Williams et al. disclose a connection structure where an epoxy or solder structure are used interchangeably.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the method of using required solder infiltrated mesh connection structure in in Powers et al., Bowman et al., and Kumar et al. combination as taught by Sanborn et al. and Williams et al. combination, because such structure would provide a thermally and physically better connection structure for the circuit assembly components.

8. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Powers et al. (4,529,836) in view of Bowman et al. (6,083,772) further in view of Ameen et al. (5,591,034) further in view of Sanborn et al. (5,221,399) further in view of Williams et al. (6,307,755).

Together in combination Powers et al. and Bowman et al. fail to disclose the heatsink structure. However, Ameen et al. disclose a thermally conductive adhesive interface that is suitable for thermal conduction between electronic components. Furthermore Ameen et al. disclose the heat sink structure.

Powers et al., Bowman et al., Ameen et al. fail to disclose the method of using solder infiltrated mesh connection structure. However, Sanborn et al. disclose a joining of printed wiring board to aluminum stiffener using adhesive film, electrically insulative mesh structure that cures at room temperature the method of using epoxy infiltrated mesh connection structure is disclosed. Williams et al. disclose a connection structure where an epoxy or solder structure are used interchangeably.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the method of using required solder infiltrated mesh connection structure in in Powers et al., Bowman et al. and Ameen et al. combination as taught by Sanborn et al. and Williams et al. combination, because such structure would provide a thermally and physically better connection structure for the circuit assembly components.

9. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Powers et al. (4,529,836) in view of Bowman et al. (6,083,772) further in view of Kumar et al. (6,280,584) further in view of Ameen et al. (5,591,034) further in view of Sanborn et al. (5,221,399) further in view of Williams et al. (6,307,755).

Together in combination Powers et al., Bowman et al., and Kumar et al. (6,280,584) disclose fail to disclose the heatsink structure. However, Ameen et al. disclose a thermally conductive adhesive interface that is suitable for thermal conduction between electronic components. Furthermore Ameen et al. disclose the heat sink structure.

Powers et al., Bowman et al., Kumar et al., and Ameen et al. fail to disclose the method of using solder infiltrated mesh connection structure. However, Sanborn et al. disclose a joining

of printed wiring board to aluminum stiffener using adhesive film, electrically insulative mesh structure that cures at room temperature the method of using epoxy infiltrated mesh connection structure is disclosed. Williams et al. disclose a connection structure where an epoxy or solder structure are used interchangeably.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the method of using required solder infiltrated mesh connection structure in in Powers et al., Bowman et al., Kumar et al., and Ameen et al. combination as taught by Sanborn et al. and Williams et al. combination, because such structure would provide a thermally and physically better connection structure for the circuit assembly components.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fazli Erdem whose telephone number is (703) 305-3868. The examiner can normally be reached on M - F 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (703) 308-6601. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

FE